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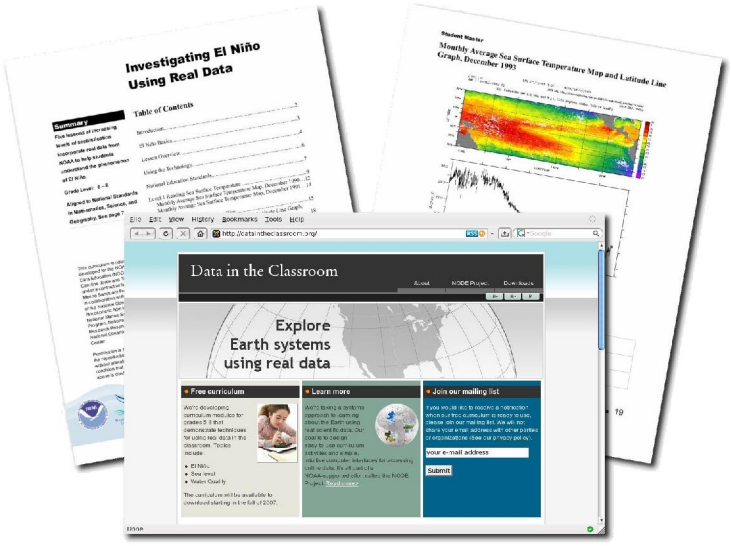
EVALUATION REPORT



QUANTITATIVE INVESTIGATION OF TEACHER REPORTED USE of the NOAA Ocean Data Education (NODE) Project

SUBMITTED TO THE NATIONAL MARINE SANCTUARY FOUNDATION

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EXECUTIVE SUMMARY

Introduction

The NOAA Ocean Data Education (NODE) Project is a multimedia program developed for grades 5-8 designed to help teachers and students access and use real time scientific data to explore dynamic Earth processes and understand the impact of environmental events on a regional or global scale. The NODE Project was designed to serve as a demonstration project that combines a system for accessing data with structured lesson plans that model the use of online data in the classroom. The hope was that through NODE, NOAA Integrated Ocean Observing System (IOOS) data providers may broaden the reach of their scientific information to achieve a more literate public who in turn will be better able to understand and protect coastal and ocean resources.

This document presents evaluation results from the 2008 field tests of the NODE materials. The developers needed to identify how a conceptual framework, using a system and scaled curriculum approach can support teachers' technology use for accessing real data and then integrating the approach into teachers' instructional practices.

For this descriptive study the primary data collection tools are online surveys that use a 5 point Liker Scale to profile middle school teacher beliefs, based on how they used the NODE Project and its education context in relationship to their instructional practice. Three basic surveys were developed to acquire self-reported responses from middle school teachers. The largest , completed by 236 teacher respondents, was designed to gain background information about educators that expressed interest in utilizing real data in their curriculum. Later surveys were completed by 18 middle school teachers based on their actual use of the NODE web site, data access tools, and scaled curriculum modules.

Based on the results of this preliminary investigation, it appears that the teacher use of the NOAA Ocean Data Education (NODE) materials did support the teachers' ability to integrate real data into their teaching practice. The NODE materials did provide a test-bed for the development of educational applications of IOOS data such as found in satellite data to monitor El Niño and Sea Surface Temperature; buoy data that examined Sea Level Rise; and water quality data from data loggers.

Overall the NODE teachers (67%) rated the NODE materials and learning experience as excellent . One teacher expressed it this way: "My students were very excited about NODE and were looking forward to working on the laptops daily . The project met specific benchmarks and was very hands-on for the students . Their interest remained high during all of the levels. " Another teacher expressed her enthusiasm this way: "I have students with extremely low academic skills and who feel they are not part of the world or the school. It is hard to find anything that interests them and this project really helped."

From the results, it can also be said that NODE resulted in an outcome that:

1) Demonstrated how different data parameters can be integrated and used to tell a compelling story about the ocean and coastal ecosystems described in the El Niño module, the world's oceans in the Sea Level module, and estuaries in the Water Quality module.

2) Provided a test bed for development of educational applications of IOOS data such as satellite data examining sea surface temperature, buoy data examining sea level height, and data logger data examining water quality.

3) Analyzed the usability of IOOS data by the non-scientific public when allowed to access data in real time using an easy-to-use interface with a reduced number of variables.

4) Served as an example for regional and national collaboration between curriculum developers and data providers to demonstrate the integration of NOAA data into educational products.

Summary of Findings

The results below provide a portrait of the middle school teachers involved in the pilot and their beliefs about the NODE Project . The salient findings of the field tests include the following:

- Teachers, whether certified or not are looking for programs with opportunities to access real data.
- Most participants in the NODE pilot used the NODE curriculum as an enhancement to their school curriculum.
- Most felt that the scaled lesson approach to technology utilization was a very strong feature of the program.
- In general, participants utilized the first 3 levels of the modules the most.
- The most frequently-cited limitations to completing additional levels were the lack of time and not understanding how to do student directed inquiry.

- Generally speaking, the main NODE components (i.e., web site, data tools, and curriculum modules) were used equally.

- Most participants identified that NODE helped them meet science standards and benchmarks.

- Most participants rated student experience with NODE as high.

- Most found the visualization tools an effective way for students to experience data.

- The highest numbers of teacher respondents found out about the NODE Project through: COSEE, the National Marine Sanctuaries in the Classroom, and the State Science Coordinators.

Recommendations

- When the NODE Project is offered more broadly beyond the demonstration phase, leaders of the organizations listed in TABLE 1 should be contacted as possible partners in recruiting teachers and providing professional development.

- Actively recruit more early-career teachers in order to get more feedback from individuals with less teaching experience .

- Teacher professional development opportunities should be developed to accompany the NODE program.

- Offer NODE Project professional development for academic graduate and undergraduate credit.

- In the next evaluation ask follow-up questions regarding length of use of the Internet in the teacher's instructional practice, and how they use the Internet in their practice.

- The NODE background materials should include a section on how to work with multidisciplinary projects before teachers attempt the modules, and how to work on collaborative teams.

- Provide teachers with additional instruction at the end of Level 3 to help prepare for the student-directed projects found in Levels 4 and 5.

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CHAPTER ONE

1.0 Document Overview

Chapter One presents the overall reasons for the evaluation of the NOAA Ocean Data Education (NODE) Project by partner agencies within the National Ocean and Atmospheric Administration (NOAA). Chapter Two features the respondents and data collection methods used to capture middle school teacher use of the NODE Project . Chapter Three contains the teacher use survey results and discussions; while Chapter Four features a discussion of the collected data. Chapter Five brings the research project to a conclusion with overall recommendations.

The NOAA Ocean Data Education (NODE) Project developed curriculum for designed to help grade 5-8 teachers and students use real time scientific data to explore dynamic Earth processes and understand the impact of environmental events on a regional or global scale.

1.1 Underlying Idea of the NODE Project

The underlying idea behind the NODE Project is that accessing historical and real-time scientific data offers exciting teaching opportunities. The NODE Project was designed to serve as a demonstration project that builds a system that other NOAA IOOS data providers may use to broaden the reach of their scientific information to achieve a more literate public and to better understand and protect coastal and ocean resources .

1.2 Challenges Educators Face When Integrating Real Time Data Access

Teachers face many challenges utilizing real time data and incorporating it into their teaching practice (2006 Assessment, Jacques Cousteau National Estuarine Research Reserve, 2006). In today's interconnected world, educators are often unable to integrate media-based learning tools, i.e., online, video, and handheld computing into their teaching practice. This inability may be related to two deficiencies teachers face beyond poor technology access: a) a lack of strategies for directly incorporating technologies into their teaching practice (Dwyer, Ringstaff, and Sandholtz, 1990) and/or the absence of curriculum contexts to support teacher curriculum beliefs in multimedia learning environments (Becker, 1999, Kerry, 2000; Pierson, 2001).

1.3 How Proposed Project Can Overcome Challenges

The NODE Project was developed to help address the deficiencies identified in the 2006 Assessment. Specifically the demonstration projected aimed to fill gaps between the actual use of technology and how it is incorporated it into the classroom by creating three new curriculum modules and online tools for accessing real time data. The three, multi-part curriculum modules, with accompanying interactive web activities, data visualizations and animations were developed and tested with middle school teachers and their students. The conceptual framework for these modules was a system and scaled approach to learning and organizing multimedia curriculum components. It was believed that this approach supports technology and real time data integration when utilizing multiple technologies related to a scientific research story.

Therefore, the prime purpose of the following evaluation is to identify how the conceptual framework, using a system and scaled approach to curriculum, supports technology use and data access.

CHAPTER TWO

2.0 About the Research

This chapter discusses how data was collected and analyzed during the NODE evaluation. In addition, this chapter presents an overview of how data was rated against the developers' underlying assumptions regarding how the NODE materials support middle school teachers in their use of real-time data.

2.1 Underlying Assumption

The underlying assumption presented by the NOAA organizational teams was: "By utilizing the NOAA Ocean Data Education (NODE) materials, teachers will be able to access and integrate real-time ocean data into their instructional practice."

2.2 Program Activities to Support the Underlying Assumption

To this end, the research examined how middle school teachers think about technology integration after using the NODE materials, including curriculum modules and web-based tools for accessing data . The research further attempted to discover how teachers use data access tools embedded within a website that also consists of:

a) Lessons to guide and organize the teachers' integration of technology into their instructional practice;

b) Science content designed to heighten student and teacher interest in using real-time data collection tools .

Additionally, the research undertook a search to detect key contexts (i.e., real scientific events, web site interactions, and modules and lessons) that supported teachers with technology and real-time data access . Ultimately, the research identified contexts within NODE that facilitate how teachers use this real time, media-based curriculum.

2.3 Research Questions

The specific purpose of the study was to address one main research question and four supporting research questions:

2.3.1 Main NODE research question

"What do teachers need to help them develop competency in the use of the online access to real data so that they will be able to integrate it into their existing array of instructional practice? "

2.3.2 Supporting NODE research questions

In order to address this main research question, four supporting research questions were studied:

2.3.2.a Supporting Research Question 1: "How did the structure and format of the NODE web site support the use and integration of online data in the teacher's instructional practice?"

2.3.2.b Supporting Research Question 2:"How did the NODE scaled lesson approach support the use and integration of online data in the teacher's instructional practice?"

2.3.2.c Supporting Research Question 3: "Does the use of a compelling scientific story support the use and integration of online data in the teacher's instructional practice?"

2.4 Survey Design

For this descriptive study, the primary data collection tools are survey formats that use a 5 point Liker Scale to profile middle school teacher beliefs. Three quantitative surveys addressed the main research question and its four sub-questions when acquiring responses from middle school teachers . The three basic surveys developed for the study are:

1. Teacher Registration Survey (Appendix A);
2. El Niño Evaluation (Appendix B); and
3. Sea Level Evaluation (Appendix C).

The research began with a collection of preliminary background data in the form of a survey teachers took

when they registered on the NODE web site. This baseline teacher survey was used to gain a cross-sectional portrait of the teaching experiences of one group of educators (N=236) that expressed an interest in NODE. This survey focused on the teachers' backgrounds related to job responsibilities, age group taught, number of teaching years, number of years experience with Internet technology, and teaching style.

2.5 Survey Respondents

Out of the 236 teachers who responded to the Teacher Registration Survey, 18 middle school science teachers eventually piloted the NODE materials. The middle school teachers in this group agreed to pilot one or more of the NODE modules with their classroom students and to take the final module use survey. Each of the two final module surveys, the El Niño Teacher Use Survey and the Sea Level Teacher Use Survey, encouraged teachers to share their experiences with, and thoughts about, the different module components, including: a) a scaled approach to learning, b) the accompanying interactive web activities, and c) data visualizations and animations based on a scientific story.

2.6 Survey Distribution

The National Marine Sanctuary Program sent out an e-mail blast nationally to all partnering organizations and directly to educators (Appendix E). The result of this mailing was the notification of various teaching communities about the NODE Project with an invitation to participate.. Interested teachers (N=236) signed onto the NODE web site, dataintheclassroom.org, to examine the site and to then respond to the Teacher Registration Survey (Appendix A) . The 236 respondents reported hearing about the NODE Project from a number of sources, summarized in TABLE 1.

TABLE 1: "How did you hear about the NOAA Ocean Data Education (NODE) project?"

Source	Number
E-mail from friends	31
COSEE	26
State Science Coordinator	21
NOAA National Marine Sanctuaries in the classroom.	20
dataintheclassroom.org	13
NSTA	10
Environmental Educator monthly newsletter	10
National Marine Educators Association	8
Lake Sturgeon Bowl (Milwaukee, WI)	8
University of WI-Milwaukee Middle School Teachers	8
NERRS	7
UGA Marine Extension Agency	7
Yahoo Middle School Teacher Site	6
Rice Creek Watershed District(Minnesota)	5
Scuttlebutt listserv	5
Georgia Institute of Technology	5
AMS Data Stream Ocean	4
Hawaiian Humpback Sanctuary	4
Science departments university	4
CSTA Conference	4
Delaware Science Coalition	4
Hatfield Marine Science Center (Newport, OR)	4
Oregon Science Teachers' Association	4
New England Aquarium e-mail newsletter	4
OMSI	4
NMEA	2
Maury Project	3
NOAA Information Exchange for Educators	3
WSST Wisconsin Society of Science Teachers	2
Columbia River Maritime Museum	2
VIMS	1
NCEE	1

The highest number of teachers came from the following organizations or sources: National Marine Sanctuaries in the Classroom (N=20); COSEE (N=26); Dataintheclassroom.org (N=13); State Science Coordinators (N=21); and e-mail from friends (N=31). A relatively high response rate (73%) was achieved given that only one e-mail blast resulted in 31 organizations providing a total of 236 Teacher Baseline survey respondents. Fifty-eight percent (18 out of 31) of the organizations participated with their students (N=395) to test the NODE modules.

Recommendation: If NODE Project is enlarged and continued, invite these organizations who had a strong showing in the demo site to participate in the next full evaluation.

2.7 Challenges to Evaluation Validity

Surveys are "one of the common data collection strategies employed in educational research today" (Fetterman, 2002, p. 29). Although the three surveys in this study allowed for the collection of data about teacher use of NODE, several challenges were faced during the program and survey dissemination. The initiating of the survey process before all NODE modules were complete proved problematic. The NODE web site was open to potential users so that they could preview the site itself, but the NODE curriculum materials were not all in place to support teacher instruction using the site. The Baseline Teacher Survey, used to collect data on the background of each respondent as they first looked at the NODE web site, found 236 teachers willing to test the NODE materials. However, the first NODE module, El Niño, was not completed until two months after the opening of the web site. This delay unfortunately resulted in the loss of interest by the majority of initial viewers. Only 18 of the initial 236 respondents returned to test the NODE materials.

A third NODE module, Water Quality, was not completed until six months after the first two modules. No respondents worked with the Water Quality module during the time teacher use data was being acquired, so teacher reactions to that module are not included in this report. Eighteen teachers from the Teacher Registration Survey expressed an interest in trying the Water Quality module with their students. A Water Quality Evaluation Survey was offered at the time that the Water Quality module was completed. This is included as Appendix D.

Teachers could also earn six Continuing Education Units from the University of Wisconsin-Milwaukee (Appendix F) for participating in the survey. Seven teachers received credit for completing modules.

2.8 Analysis of Results

Data were analyzed through totaling the frequency of responses. The responses were then converted to percentage scores for each of the questions to use in the analysis process. Where the questions were the same on the El Niño Teacher Use Survey (N=14) and on the Sea Level Teacher Use Survey (N=4), the respondent numbers were combined (N=18).. If a survey question focused on a specific data tool or a specific NODE module, then the individual number of responders from that module's survey were recorded alone.

CHAPTER THREE

3.0 Survey Results

This Chapter is divided into three sections: 1) Baseline Teacher Survey results of 236 respondents; 2) Teacher Use Modula Survey Results of 18 middle school teachers; and 3) Research question results of 14 middle school educators.

3.1 Teacher Registration Survey Results

This section describes the main results and analysis of 236 educator respondents who answered a Teacher Registration Survey to gain information on educator interest in real-time data access for the classroom. The results of the Teacher Registration Survey were used to determine teachers' pre-existing opinions about technology integration prior to their possible participation in NODE. Out of the 236 educators, 18 teachers were identified to participate in the testing of the NODE web site. As mentioned in Chapter Two, 18 out of 31 organizations (58%) of respondents participated with their students (N=395) to test the NODE modules.

The Teacher Registration Survey includes nine sub-questions used to gain an understanding of who respondents are as teachers.. These sub-questions cover such topics as: how teachers integrate real-time data, years of teaching experience and technology use, and discipline taught.

3.1.1 Initial Respondents of NODE Web site

The Teacher Registration Survey was used to profile teachers (N=236) who viewed the NODE web site. The most salient characteristics of these teachers are as follows.

TABLE 1: Teacher Respondent Characteristics

Description	Number	Percentage
1. Taught science	N=197	88%
2. Taught Middle School	N=158	70%
3. Have extensive teaching experience 6-10+ yrs	N=176	80%
4. Internet use for more than 6 yrs	N=116	52%
5. Integrated multimedia into practice	N=66	31%
6. Certified in science education	N=141	63%
7. Have some science course work	N=133	58%

One hundred and sixteen teachers (52%) reported having used the Internet for at least 6 years. In contrast to the high number of teachers with years of teaching experience, only sixty-six teachers or 31% integrate technology and multimedia into their teaching on average of just a few times a month or not at all, while only 57% or N= 128 teachers use multidisciplinary projects to integrate technology. Fifty-seven percent (N=128) teachers plan to use the NODE Project as an enhancement to their science curriculum.

3.1.2 Primary Job Responsibilities

TABLE 2: Baseline NODE Participants' Primary Job Responsibility

N = 236		
Description	Number	Percent
Science Teacher	N=197	88%
Math Teacher	N=28	12%
Science Coordinator	N=37	16%
School Curriculum Administrator	N=4	2%
Principal or Superintendent	N=0	0%
Student	N=0	0%
Parent	N=8	3%

As shown in TABLE 2, the teacher survey respondents (N=236) reported being primarily science teachers (N=197 or 88%). Seventy percent (N=158) reported being middle school teachers with 63% (N=141) of the teachers certified as science teachers (TABLE 3) compared with N= 133 of 58% having some course work in science. Eighty percent of the respondents (N=176) have extensive teaching experience between 6-10 years (TABLE 4).

Forty-one respondents were either science coordinators or science curriculum administrators. This fact compared to information found in TABLE 1 suggests that a high rate of science coordinators and organizations from colleges alerted teachers about the project.

Recommendation: When NODE is offered beyond the demonstration phase, contact the leaders of the organizations in TABLE 1 to encourage their continued participation in the project with their teachers and to set-up professional development sites.

3.1.3 Number of Years Teaching

TABLE 3: Number of Years Teaching Experience

N=236		
Description	Number	Percent
New Teacher	N=3	1%
Teacher 1-2 years	N=6	3%
Teacher 3-5 years	N=35	16%
Teacher 6-10 years	N=39	18%
More than 10 years	N=137	62%
No Answer	N=116	

A high level of respondents (62%) have more than 10 years teaching experience, while 74 out of the 236 respondents (34%) have 3-10 years of teaching experience. The NODE Project attracted a high level of experienced teachers to the site.

Recommendation: When NODE is offered beyond the demonstration phase, encourage teachers with less experience to join. Teacher professional development opportunities should be developed to accompany the NODE program.

3.1.4 Academic Training

TABLE 4: "What types of academic training in science have you achieved?"

N=236		
Description	Number	Percent
Science Certification	N=141	63%
Science Course Work	N=132	58%

One hundred and forty-one respondents (63%) are certified science teachers, followed by 132 teachers (58%) having some level of science course work. It appears that science teachers, whether certified or not, are looking for programs with real time data access opportunities. Baseline Teacher

Recommendation : Offer NODE for academic Graduate and Undergraduate credit.

3.1.5 Teacher Internet Use

TABLE 5: "How long have you been using the Internet in your teaching practice?"

N=194		
Description	Number	Percent
New teacher who has not used Internet	N=1	0.45%
Experienced teacher but never used Internet	N=3	1%
Used Internet for 1-3 years	N=35	16%
Used Internet for 4-6 years	N=39	18%
Used Internet for 7 years or more	N=116	52%

A high level of the teachers (N=116 or 52%) reported using the Internet for 7 years or more with another 18% saying that they have used the Internet for 4-6 years. Only one teacher in the survey had very little experience using the Internet.

3.1.6 Time Engaged in Computer or Internet Activities with Students

TABLE 6: "How often to you engage in computer and Internet activities with your class?"

N=217		
Description	Number	Percent
Every day	N=45	19%
A few times a week	N=79	37%
A few times a month	N=66	31%
Once a month	N=23	20%
Never	N=3	1%

Thirty-seven percent of the teachers (N=79) reported that they engaged in computer and Internet activities with their students a few times a week with another 31% of teachers (N=66) saying they use the Internet with their classes a few times a month. Forty-five of the teachers (19%) used the Internet with their classes every day.

3.1.7 Integration Plan for NODE

TABLE 7: "How do you plan to integrate this project into your teaching practice?"

N=224		
Description	Number	Percent
Use as an enhancement to my school curriculum	N=128	57%
Use every day for a given amount of time	N=21	9%
Use it as a high interest lesson	N=76	34%
Not sure	N=65	29%

Most teachers (N=128 or 57%) said they would use the NODE web site and materials as an enhancement to their school's existing curriculum with 76 of the teachers (34%) seeing NODE as a high-interest assignment for their students. Twenty-nine percent of teachers (N=65) are unsure how they would use NODE.

Recommendation: In the introduction to the NODE Teachers Guide, present examples of how to integrate the materials into their existing curriculum and teaching practice.

3.1.8 Multidisciplinary Projects and Technology Use

TABLE 8: "How much of your classroom technology use involves multidisciplinary projects?"

N= 236		
Description	Number	Percent
None	N=16	7%
Some	N=120	51%
Most	N=69	29%
All	N=7	3%
No answer	N=24	10%

Based on TABLE 8,120 teachers (51%) reported only some use of technology integration with multidisciplinary projects, and 29% (N=69) reported that most of their classroom technology use is linked to multidisciplinary projects.

Recommendation: The NODE module Teacher's Guides should include a section on how to work with multidisciplinary projects and teachers should be told to read that before they attempt the NODE modules.

3.1.9 Technology and Collaboration Teams

TABLE 9: "How much of your classroom technology use involves students working in collaborative teams?"

N=236		
Description	Number	Percent
None	N=3	1%
Some	N=128	54%
Most	N=75	32%
All	N=6	3%
No answer	N=24	10%

Fifty four percent of teachers (N=128) reported encouraging their students to work in collaborative teams some of the time when using technology and 3% only used technology in their classroom when students were working in collaborative teams.

Recommendation: While the module activities ask teachers to put students into teams when working with

real-time data access, there is no explanation in the NODE Teacher's Guide stressing why this is important. Include a new section in the Teacher's Guide explaining how and why teachers need to use collaborative teams.

3.2 Module Evaluation Survey Responses

The results in this section refer to the combined responses from two surveys that examined teacher self-reported use of the two NODE modules, El Niño and Sea Level. Both surveys asked the same questions regarding web site form and function, scaled curriculum approach, online real-time data access, and use of scientific stories to integrate data with content. The combining of the two sets of survey respondents allowed for more responses (N=18) to the survey topic.

3.2.1 El Niño and Sea Level Teacher Use Survey Results

As noted earlier, out of the 236 educators who expressed an interest in piloting NODE, only 18 middle school educators ultimately completed one of the module evaluation surveys. The teachers agreed to work with their students to complete one or more modules, to access online data, and to complete assessments. The total number of middle school students participating in the project was 395. Each module took an average of 5 to 6 weeks to complete.

3.2.2 Middle School Teacher Responses (N=18)

El Niño	N=14
Sea Level Rise	N= 4

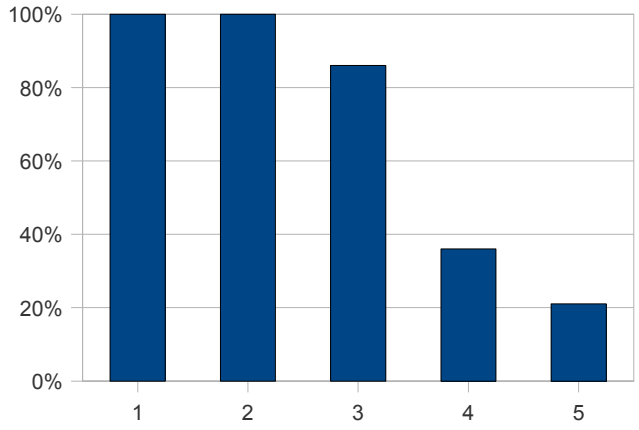
There were more female (N=11) teachers participating in the pilot than male (N=7) teachers. Most of the participating teachers (33%) had no science certification with 12 teachers (66%) having some type of formal science certification. Seven teachers (38%) had taken no science classes, but 11 teachers (61%) had received some type of formal science courses.

3.2.3 Lesson Level Achievement

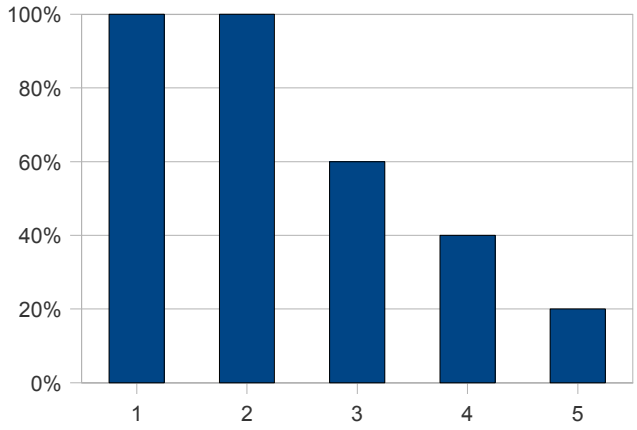
TABLE 10: Level (lessons) that teachers and students completed for each module.

	El Niño		Sea Level	
Description	Number of teachers	Percent	Number of teachers	Percent
Entry Level 1	N=14	100%	N=4	100%
Adoption Level 2	N=14	100%	N=4	100%
Adaptation Level 3	N=12	86%	N=3	60%
Interactivity Level 4	N= 5	36%	N=2	40%
Invention Level 5	N=3	21%	N=1	20%

GRAPH 1: Level participation: El Niño module



GRAPH 2: Level participation: Sea Level module



x-axis: module level
y-axis: % participation

The completion rates for both the Sea Level module and the El Niño module indicate a like trend in use. Both indicate that all teachers completed module Levels 1 and 2, with a decrease of 20% to 40% in the use of Level 3. Level 4 (40%) and Level 5 (20%) teacher respondents reported a use rate that is almost identical between the two modules.

To evaluate the drop-off in participation, it is important to note the differences in lessons at each level. Entry Level 1 and Adoption Level 2 contain teacher-directed activities where teachers directly state what the student is to do next and how to use the real-time data access tools on the web site. The third level,

Adaptation, lost 14% of participating teachers, possibly because of the addition of student-directed activities to the teacher-directed activities.. Level 3 is also the last level in which directions are given on how to directly interact with the real time data access servers. Only 40% (N=7) of the teachers transitioned to Interactivity Level 4. This level has the teachers introducing an inquiry project where students need to use the real-time data access server to prove the answer to a research question. This level is still only partially student directed. However, Invention Level 5 activities are totally student directed. Approximately 20% of the teachers transition to Level 5; in other words, t here was an 80% drop in teacher use from Levels 1 and 2 to Level 5.

Recommendation: Additional instruction needs to be given at the end of Level 3 to help teachers transition to the student-directed projects in Levels 4 and 5.

3.2.4 Reason for Stopping NODE Participation

TABLE 11: Why did you stop at the last level you completed?

N=18		
Description	Number	Percent
I completed all the lessons	N=5	28%
It was too hard.	N=2	11%
I ran out of time.	N=9	50%
The material was too difficult for my students.	N=2	11%
The material was too difficult for me to implement.	N=1	5%
The additional lessons did not fit my needs.	N=1	5%
The materials were not required by my school district.	N=0	0%

Twenty-two percent (N=4) of teachers worked with all 5 module levels. These teachers reported "The data was very easy to use and the teachers guide was very easy to understand. " They also indicated that the lessons helped them do a better job of teaching the inquiry process to their students. Another teacher who used all modules said: "My students were able to understand and complete the modules that were presented to them without their previous complaint that science inquiry was too difficult. Fifty percent of teachers (N=9) reported that they ran out of time and stopped before they moved into the student driven inquiry sections. However, they actually enjoyed working with the modules. One teacher who stopped working on the project after Level 3 stated: "I think the materials are excellent, but my students were not up to the level

needed to use them." Another teacher who stopped working on the project after the Level 3 expressed his/her reasons in the following way: "It would be better to have my students better understand the steps to the inquiry approach before they begin to do the project. I will make sure I do this before I take my next class through the El Niño module." Other teachers (N=2) reported that the materials were too difficult for their students.

Recommendation: Identify how to support teachers transitioning from Level 3 to Levels 4 and 5 and provide more direction on how to use teacher-directed versus student-directed inquiry.

3.3 Research Question Results

In Section Three, this report examines : 1) questions related to the structure and format of the NODE web site; 2) questions related to the scaled level approach to the use of real-time data access and content; 3) questions related to teacher use of technology and real-time data access; and 4) questions related to the scientific story and integration of real-time data in instructional practice.

3.3.1 NODE Structure and Format

Supporting Research Question 1: "How did the structure and format of the NODE web site support the use and integration of online data in the teacher's instructional practice?"

All teacher participants from both the El Niño module and the Sea Level module responses were added together to explore the support given by the module structure and format. This was done to better analyze the ability of a non-scientific public to access IOOS data when using an easy-to-use web interface with a reduced number of variables.

TABLE 12: "How did the NODE module structure and format provide a context for teaching core science linked to technology integration?"

N=18 Teachers			
Sub-question	Response	Number	Percent
1. "NODE web Format was easy to use?"	Strongly agree	11	61%
	Agree	7	39%
2. "The web navigation format was easy to use?"	Strongly agree	7	57%
	Agree	9	43%
	Neither agree or disagree	1	5%
3. "The graphs, maps, and charts of data were clear and easy to use?"	Strongly agree	11	61%
	Agree	7	39%
4. "The module provided a useful context for teaching core science."	Strongly agree	11	61%
	Agree	7	39%
5. "The instructional approach for teachers to the NODE access server was easy to use?"	Strongly agree	13	72%
	Agree	5	28%

Fifty-five percent of the teachers surveyed (N=10) reported that the NODE web site had an easy-to-follow format . The structure and format was well received by the teachers.

3.4 NODE Scaled Lesson Approach

2.3.2.b Supporting Research Question 2:"How did the NODE scaled lesson approach support the use and integration of online data in the teacher's instructional practice?"

The NODE designers believed that, through the utilization of scaled levels of technology integration, teachers would be able to more easily integrate real-time data into their teaching practices. Each NODE module (El Niño and Sea Level Rise) offers activities at five different levels of teacher and student interaction, sometimes referred to as Entry, Adoption, Adaptation, Interactivity, and Invention. These five levels are intended to support teacher use with online tools so that teachers can access real-time data and provide models of use to their students on how to integrate and use data.. The early levels (Level 1 Entry to Level 3 Adaptation) are very teacher directed in delivery. The later levels (Level 4 Interactivity and Level 5 Invention) are student directed.

Evaluation surveys completed by teachers using the El Niño module shed light on the usefulness of the scaled lesson approach. Responses to statements relating to the scaled lessons are summarized in the tables below.

3.4.1a El Niño Entry Level 1: Reading Sea Surface Temperature (SST)

TABLE 13: Teachers who completed Entry Level 1 were asked whether they agreed or disagreed with the following statements about the lesson and materials.

N=14 Teachers			
Statement	Response	Number	Percent
1. "This lesson showed me how to access materials on the web site such as lesson plans, maps, and real data."	Strongly agree Agree	8 6	57% 43%
2. "This lesson provided a useful way for me to introduce the topic to my students because it was very teacher-directed."	Strongly agree Agree	8 6	57% 43%
3. "This lesson helped me understand how to access real data on the web site before I had to show my students how to use it."	Strongly agree Agree	8 6	57% 43%

The primary question for Entry Level 1 (TABLE 13) was: "Did Entry Level One help teachers utilize direct instruction to introduce the web site, real-time data access, and module content? " Responses to Statement 1 indicate that the majority of middle school teachers (N=14) strongly agreed (57%) or agreed (43%) that they were able to access the NODE materials and travel through the web site with no trouble. These teachers (100%) also felt (Statement 2) that they were able to work with the Sea Surface Temperature (SST) content because of the support given in Level 1's method of directed instruction. In addition, results from Statement 3 indicate that teachers strongly agreed (57%) or agreed (43%) that, after their own initial instruction on how to use the NODE web site, data access site, and instructional materials, the teachers themselves were better prepared to show their students (N=245) how to access real data via the web site.

3.4.2b El Niño Adoption Level 2: Looking at SST Another Way

TABLE 14: Teachers who completed Adoption Level 2 were asked whether they agreed or disagreed with the following statements about the lesson and materials.

N=14 Teachers			
Statement	Response	Number	Percent
1. "This lesson was useful for showing students how to work with the web site the first time."	Strongly agree	8	57%
	Agree	5	36%
	Disagree	1	7%
2. "This lesson was useful because my students were able to practice retrieving real data before they worked on a scientific problem."	Strongly agree	8	57%
	Agree	6	43%
3. "The opportunity to drill and practice helped my students and me become confident in accessing real data using the web site."	Strongly agree	8	57%
	Agree	6	43%
4. "This lesson succeeded at bringing technology and science content together in a real world science context."	Strongly agree	9	64%
	Agree	5	36%
5. "The choice of education standards was appropriate."	Strongly agree	3	21%
	Agree	10	71%
	Disagree	1	7%

Five statements addressed this question with the following results. Responses to Statement 1 showed how 13 out of the 14 teachers (93%) agreed that Level 2 assisted students initial examination of real-time data. Responses to Statement 2 indicate that teachers (N=14) strongly agreed (57%) or agreed (43%) that it was useful for their students (N=395) to be provided with practice situations to retrieve real-time science data. Teachers (Statement 3) also indicated (N= 8 or 57% strongly agreed and N=6 or 43% agreed) that there were sufficient practice problems to provide drill and practice for students using the real-time data on the web site. Nine teachers strongly agreed with six teachers agreeing with Statement 4 that Adoption Level 2 was able to provide a real-world scientific context for sea surface temperature and real-time SST data. Statement 5 resulted in a difference being noted about how appropriate the choice of educational standards was. Three teachers strongly agreed (21%) that the educational standards were appropriate, 10 teachers agreed (71%), and one teacher disagreed (7%) that the standards were appropriate.

3.4.2c El Niño Adaptation Level 3: Detecting El Niño

TABLE 15: "Teachers who completed Adaptation Level 3 were asked whether they agreed or disagreed with the following statements about the lesson and materials.."

N=12 Teachers participating in Level 3			
Statement	Response	Number	Percent
1. "I found it useful to use both a teacher-directed and student-directed style to guide students in the collection of real data based on the science content."	Strongly agree Agree	10 2	83% 17%
2. "Students practiced applying data access skills in collecting real data."	Strongly agree Agree	10 2	83% 17%
3. "My students found the use of visualization tools such as graphing and map reading, useful in order to understand science concepts."	Strongly agree Agree	9 3	75% 25%

The primary question for Adaptation Level 3 (TABLE 15) was: "How did Adaptation Level 3 support the ability of teachers using a totally teacher-directed approach in module Levels 1 and 2 to transition toward a student-directed approach of play and practice with online data and technology?" Three statements addressed this question with the following results. Ten teachers strongly agreed (71%) with Statement 1 that Level 3 supported both teacher- and student-directed approaches in working with real data access. For Statements 2 and 3, 12 teachers (85%) agreed or strongly agreed that their students had been able to work with data collection tools on their own and had found visualization tools useful in understanding the data and concepts. However, it should be noted that the Adaptation Level 3 lost the participation of two teachers (14%) and their students (N=52). There was a similar decline in participation at this level by users of the Sea Level module (N=4 teachers dropped by N=1 or 14%).

3.4.2d El Niño Interactivity Level 4: Relating SST to Productivity

TABLE 16: Teachers who completed Interactivity Level 4 were asked whether they agreed or disagreed with the following statements about the lesson and materials.."

N=5			
Statement	Response	Number	Percent
1. "This lesson allowed my students to use a variety of information resources to build their own understanding of the content."	Strongly agree	2	40%
	Agree	3	60%
2. "This lesson enabled my students to work with technology in a self-directed way."	Strongly agree	2	40%
	Agree	2	40%
	No Response	1	20%
3. "I did not have to give much guidance to my students to use their skills to access real data."	Strongly agree	1	20%
	Agree	1	20%
	Disagree	3	60%
4. "Students were able to use student-directed inquiry to solve a scientific problem."	Strongly agree	2	40%
	Agree	3	60%

The primary question for Interactivity Level 4 (TABLE 16) was: "Did Interactivity Level 4 facilitate the use of complex technology interactions utilizing problem-solving (inquiry) techniques such as real-time data analysis? " Four statements addressed this question. Before addressing the results of TABLE 16, it should be noted that eleven teachers or (N=11 out of 14 or 79%) had dropped the use of NODE at this level. The remaining teachers (N=5) however agreed or strongly agreed with Statement 1 that Interactivity Level 4 supported students in their collection of real-time data based on previous levels of involvement (N=5) and agreed or strongly agreed with Statement 2 that their students were able to do this in a self-directed approach when acquiring data resources. Statement 4 examined the students' ability to use student-directed inquiry to solve a scientific problem and found that all teachers (N=5) agreed or strongly agreed that Interactivity Level 4 did facilitate this activity.

3.4.2e El Niño Invention Level 5: Design Your Own Investigation

TABLE 17: Teachers who completed Invention Level 5 were asked whether they agreed or disagreed with the following statements about the lesson and materials.

N=3			
Statement	Response	Number	Percent
1. "This lesson supported my use of a variety of teaching styles and my ability to select the style that is most appropriate to the content and to the needs of the student."	Strongly agree Disagree	2 1	67% 33%
2. "This lesson supported my students in their study of the relationship between two different data sets and applying them to a real research problem."	Strongly agree Disagree	2 1	67% 33%
3. "At this level, my students were able to access and identify real data on the server and analyze it."	Strongly agree Agree	1 2	33% 67%
4. "When my students reached this level, they were able to use student-directed inquiry."	Strongly agree Agree	1 2	33% 67%

The primary question of Invention Level 5 was: "Did Invention Level 5 facilitate students' ability to design their own research project that combined technology, real-time access, and science content?" Level 5 was the highest level of real-time data interaction and was linked to a student designed research project utilizing real-time data acquisition. Four statements address teacher thoughts regarding how they were supported at this level. As in Level 4, 79% of the original 18 teachers dropped their participation. However, it should also be noted that all of the teachers (N=3) who tested Level 4 with their 70 + students also completed the highest level of interaction, Invention Level 5. Sixty-seven percent of these teachers (N=2) agreed with Statement 1 that Level 5 supported their use of a variety of teaching styles or methods. The same number of teachers (N=2) strongly agreed with Statement 2 that Invention Level 5 supported students when they compared two real-time data sets applied to a research problem of their design. A third teacher disagreed. All teachers (N=3) agreed with Statement 3 that their students (N=70) were able to access data on the server without any assistance from their teachers. Level 5 directed students to create their own scientific problem to connect real-time data, science content, and a research questions. All three teachers agreed (Statement 4) that their students were able to successfully accomplish this task.

3.6 Scientific Story and Real Time Data Integration

Supporting Research Question 3: "Does the use of a compelling scientific story support the use and integration of online data in the teacher's instructional practice?"

TABLE 18: Teachers were asked whether they agreed or disagreed with the following statements about the lesson and materials.

N=18			
Sub-question	Response	Number	Percent
1. "Did the scientific stories provide a context to bring scientific content and real-time data together?"	Strongly agree Agree	N=16 N=13	88% 16%
2. "Did the scientific story provide a context for teaching core science?"	Strongly agree	N=11	61%
3. "Did increasing levels of inquiry help teachers integrate technology and real time data into teaching practice?"	Strongly agree Agree	N=11 N=7	55% 37%
4. "Did story content help students meet benchmarks and education standards?"	Strongly agree Agree	N=12 N=6	67% 33%
5. "Did the scientific story provide a variety of information for students to build their own understanding of content?"	Strongly agree Agree	N=17 N=1	94% 6%

The sub-questions found in TABLE 18 were designed to gain an understanding about how teachers use a scientific story to demonstrate how different data parameters can be integrated to understand the ocean and coastal ecosystems described in the El Niño and Sea Level modules.

The first sub-question asked:" Did the scientific stories provide a context to bring scientific content and real time data together? " Sixteen teachers (88%) strongly agreed with the statement as well as 61% indicating that the scientific story provided a context for teaching core science in sub-question two. Inquiry played an important role in data acquisition related to the scientific story that provided a context that had an issue. While only 55% or just over half of the teachers strongly agreed with the statement, 37% said they were unsure. Within the curriculum modules, authentic research questions and supporting sub-questions were used by students to build hypotheses in the context of the scientific story. This method draws out student preconceptions before their exploration of real time data in order to help assess progress toward understanding. Students make a plan to test their individual or team hypotheses using the NODE portal and

tools for data manipulation. This method reinforces students' understanding of the content, context, and scientific processes.

Sub-question four asked:" Did the scientific story help students meet benchmarks and education standards? " Sixty-seven percent of the teachers strongly agreed. It can be suggested that teachers were able to implement such benchmarks as the Essential Principles of Ocean Science and other earth science standards.

Sub-question five asked:"Did the scientific story provide a variety of information for students and teachers to build their own understanding of content? " Ninety-four percent of the 18 teachers strongly agreed with this statement.

3.7 Overall Rating

The final question on both module evaluation surveys asked teachers to rate the NODE materials overall.

TABLE 19: "Overall I rate NODE materials as…"

N=18		
Description	Number	Percent
Excellent	N=12	67%
Good	N=5	28%
Average	N=1	5%
Below average	N=0	
Poor	N=0	

CHAPTER FOUR

4.0 Discussion

The NOAA Ocean Data Education (NODE) web site provided a test-bed for the development of educational applications of IOOS. Based on the results of this preliminary investigation, it appears that a teacher's use of the web site does indeed support that teacher's ability to integrate real-time data into their teaching practice. A number of primary conclusions can be drawn:.

First, the level of support found in the structure and format of the NODE web site provides a context for teaching core science that encourages the integration of real-time data access from buoy, satellite, and data loggers. Teachers (N=18) found the web site easy to use and easy to move from one location or activity to another. Teachers (100%) found they were able to navigate between modules, lessons, assessments, and real-time data access on the web site. Also, 61% of teachers strongly agreed that the structure and the format of the NODE web site provided a useful context for teaching core science because of its scaled instructional approach (72%) that incorporated easy to use (61%) graphs, maps, and charts.

Second, the scaled lesson approach supported real-time data access, collection, and integration into teachers' (N=18) instructional practice. One teacher expressed the following: "The lesson format was wonderful. Starting with teacher directed instruction and moving towards student directed work was GREAT!" Teachers, who completed the Entry Level 1 (N=18) strongly agreed that starting with a direct instruction method supported teachers because it made NODE easy to use when introducing the web site (57%), real-time data access (57%), and working with module content and training materials (57%).

The Adoption Level 2 also supported teachers (100%) utilizing a very prescriptive approach to assist students in accessing real-time data for the first time (57%). This level presented a way for teachers to instruct their students about how to retrieve real-time data (57%) and gave teachers a concrete way to provide students with a scientific context for using that data (64%). Teachers who completed the Adaptation Level 3 (N=10) were able to transition from a totally teacher-directed approach to presenting materials to encouraging students to manipulate data on their own or in teams using data collection tools. However, it should be noted that this level lost 20% of the teachers (N=4). It is recommended that more instruction be

given to the teacher on how to assist students to work on their own project. Fifty percent of the Level 3 teachers reported that they ran out of time and 11% thought the materials were too difficult. There is a dramatic drop of use in the Interactivity and Invention levels of teacher participation. However, the 22% of teachers who completed all levels of interaction reported that their students were able to work with real-time data based on previous levels (N=3) and this level supported a student-directed inquiry project based on a proposed issue (N=4).

The last level, Invention Level 5, asked students to design their own investigation in which they would use their data access skills. Only three teachers remained at this level, but they all reported that their students were able to do a self-directed inquiry project using real-time data access. A quote from a participating teacher said: "This module was a very good way for me to teach the inquiry process to my students. " What can be suggested is there is a level or levels that provide support for teachers to access IOOS data. Teachers moved from the first to second and third levels with ease. When the level became an inquiry project that was student-directed there was a large loss of participation. It is recommended that, in the Teacher's Guide, the first three levels are clustered in a way that emphasizes that students completing these three levels and having used the NODE web site and real-time data collection tools, will know how to access real-time data Then cluster the descriptions of Levels 4 and 5, stressing that these two levels are where students can apply what they have already learned in Levels 1 through 3 about real-time data access to design a real inquiry project based on real scientific data.

Third, teachers felt that NODE supported student's acquisition of real-time data and teachers' ability to integrate this data into their instructional practices by: 1) using real-time data with real science (67%); 2) providing access to teacher training materials (67%); 3) helping teachers understand and use the data access web site before students used it (67%); 4) providing drill and practice so that students and teachers could develop their ability to access data (67%); 5) enabling students to experience the retrieval of real-time data on their own (100%); and 6) providing the applets and visualization tools (72%) that helped their students have an understanding of real-time data access before they worked with it.

Fourth, teachers felt that NODE supported how teachers and students used satellite, buoy, and data logger data by providing compelling scientific stories about ocean and coastal ecosystems. Teachers felt that these stories provided a context that brought scientific content and real-time data together (88%). They also suggested that, once the context was in place, students were able to effectively engage with the core science

(61%) in order to address the science standards and benchmarks (67%). Teachers (N=11) found it useful to have the scientific story presented in levels of interactivity because they were then able to integrate technology and real-time data into their instructional practices in a way that made sense to them (55%). Lastly, teachers felt that the NODE scientific stories provided a variety of information that students could take from and use to build their own understanding of the content (94%).

Fifth, the respondent teachers felt that NODE provided a test-bed for the development of educational applications using IOOS data (i.e., using satellite data to examine sea surface temperature, using buoy data to examine sea surface rise, and using data from loggers to examine water quality).

CHAPTER FIVE

5.0 Conclusion

The NOAA Ocean Data Education (NODE) Project developed a curriculum for grades 5-8 that was designed to help teachers and students access and use real-time scientific data so that they could explore dynamic Earth processes and understand the impact of environmental events on both a regional and global scale. NODE was designed to serve as a demonstration project creating a system that other NOAA IOOS data providers might use to broaden the reach of their scientific information, to achieve a more literate public, and to promote better understanding and protection of coastal and ocean resources.

The prime purpose of the evaluation was to identify how a conceptual framework, using a system and scaled approach to multimedia curriculum, supports teachers' use of online access to real data.

For this descriptive study, the primary data collection tools were surveys that used a 5 point Liker Scale. Three quantitative surveys addressed the main research question and its four sub-questions.. A large scale survey targeted 236 teacher respondents to gain background information about educators interested in utilizing real-time data access in their curriculum. Two smaller scale surveys targeted 18 middle school teachers to probe their actual use of the NODE web site, real-time data access tools, and NODE scaled lesson modules.

Based on the results of this preliminary investigation, it appears that the teacher use of the NODE web site did support their ability to integrate real-time data into their teaching practice. The NODE web site did provide a test-bed for the development of educational applications of IOOS data such as satellite and sea surface temperature data to monitor El Niño, , buoy data to examine rising sea level, and data from data loggers to monitor water quality.

Overall the NODE teachers (67%) rated the NODE materials and learning experience as excellent. One teacher expressed it this way: "My students were very excited about NODE and were looking forward to working on the laptops daily. The project met specific benchmarks and was very hands-on for the students. Their interest remained high during all of the levels. " Another teacher expressed her enthusiasm in this

way: "I have students with extremely low academic skills and who feel they are not part of the world or the school. It is hard to find anything that interests them and this project really helped."

From the results, it can also be said that NODE resulted in an outcome that:

1) Demonstrated how different data parameters can be integrated and used to tell a compelling story about the ocean and coastal ecosystems described in the El Niño module, the world's oceans in the Sea Level module, and estuaries in the Water Quality module.

2) Provided a test bed for development of educational applications of IOOS data such as satellite data examining sea surface temperature, buoy data examining sea level height, and data logger data examining water quality.

3) Analyzed the usability of IOOS data by the non-scientific public when allowed to access data in real time using an easy-to-use interface with a reduced number of variables.

4) Served as an example for regional and national collaboration between curriculum developers and data providers to demonstrate the integration of NOAA data into educational products.

Additional Findings

The results below provide a portrait of the middle school teachers involved in the pilot and their beliefs about the NODE Project . The salient findings of the field tests include the following:

- Teachers, whether certified or not are looking for programs with opportunities to access real data.
- Most participants in the NODE pilot used the NODE curriculum as an enhancement to their school curriculum.
- Most felt that the scaled lesson approach to technology utilization was a very strong feature of the program.
- In general, participants utilized the first 3 levels of the modules the most.
- The most frequently-cited limitations to completing additional levels were the lack of time and not understanding how to do student directed inquiry.
- Generally speaking, the main NODE components (i.e., web site, data tools, and curriculum modules) were used equally.
- Most participants identified that NODE helped them meet science standards and benchmarks.
- Most participants rated student experience with NODE as high.

- Most found the visualization tools an effective way for students to experience data.
- The highest numbers of teacher respondents found out about the NODE Project through: COSEE, the National Marine Sanctuaries in the Classroom, and the State Science Coordinators.
- More female teachers participated than males.
- Most participants had a science certification.
- Most have taken additional science courses.
- Most have a lot of teaching experience (6-10 years).
- Most have access to the Internet in their classroom or schools.
- Most have many years working with the Internet (6 years).
- Most are middle school teachers who teach science.
- Most teach 45 to 50 minute classes in science.
- Most have their students engage in group projects.

Recommendations

- When the NODE Project is offered more broadly beyond the demonstration phase, leaders of the organizations listed in TABLE 1 should be contacted as possible partners in recruiting teachers and providing professional development.
- Actively recruit more early-career teachers in order to get more feedback from individuals with less teaching experience .
- Teacher professional development opportunities should be developed to accompany the NODE program.
- Offer NODE Project professional development for academic graduate and undergraduate credit.
- In the next evaluation ask follow-up questions regarding length of use of the Internet in the teacher's instructional practice, and how they use the Internet in their practice.
- The NODE background materials should include a section on how to work with multidisciplinary projects before teachers attempt the modules, and how to work on collaborative teams.
- Provide teachers with additional instruction at the end of Level 3 to help prepare for the student-directed projects found in Levels 4 and 5.

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APPENDICES

Appendix A: Teacher Registration Survey

Teacher Registration

About You

*** 0001: Your name**

Please write your answer here:

0002: School/Organization

Please write your answer here:

0003: Address

Please write your answer here:

*** 0004: E-mail address**

Please write your answer here:

*** 0005: What is your job responsibility**

Please choose *all* that apply:

- Science Teacher
- Math Teacher
- Science Coordinator
- School Curriculum Administrator
- Principal or Superintendent
- Student
- Parent

Other:

0006: What age group do you work with?

Please choose *all* that apply:

- Elementary (K-5)
- Middle school (6-8)

- [ ] High school (9-12)
- [ ] College
- [ ] Adult learners
- [ ] Not applicable

Other:

0007: How many years have you been a teacher?

Please choose *only one* of the following:

- [ ] I am a new teacher.
- [ ] I have been a teacher 1-2 years.
- [ ] I have been a teacher 3-5 years.
- [ ] I have been a teacher 6-10 years.
- [ ] I have been a teacher more than 10 years.

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* **0008: How long have you been using the Internet in your teaching practice?**

Please choose *only one* of the following:

- [ ] I am a new teacher and have not used the Internet in my teaching practice.
- [ ] I have never used the Internet in my teaching practice.
- [ ] I have been using the Internet for 1-3 years.
- [ ] I have used the Internet 4-6 years.
- [ ] I have used the Internet for 7 or more years.

0009: How often do you engage in computer and Internet activities with you class?

Please choose *only one* of the following:

- [ ] Every day
- [ ] A few times a week
- [ ] A few times a month
- [ ] Once a month
- [ ] Never

0010: How do you plan to integrate this project into your teaching practice?

Please choose *all* that apply:

- [ ] I plan to use it as an enhancement to my school curriculum.
- [ ] I plan to use it every day for a given amount of time.
- [ ] I plan to use it as a high interest lesson.
- [ ] I am not sure yet how I will use it.

Other:

0011: What types of academic training in science have you achieved?

Please choose *all* that apply:

- [ ] Science certification
- [ ] Science coursework

Other:

0012: How long are your class periods?

Please choose *only one* of the following:

- [ ] 35 minutes
- [ ] 45 minutes
- [ ] 50 minutes
- [ ] Block scheduling
- [ ] Other

0013: How much of your classroom technology use involves multidisciplinary projects?

Please choose *only one* of the following:

- [ ] None
- [ ] Some
- [ ] Most
- [ ] All

0014: How much of your classroom technology use involves students working in collaborative teams?

Please choose *only one* of the following:

- [ ] None
- [ ] Some
- [ ] Most
- [ ] All

0015: Which best describes your teaching style?

Please choose *only one* of the following:

- [ ] I use a lecture style almost exclusively.
- [ ] I often use lectures but sometimes teach lessons that allow students to use a variety of information resources to build their understanding of content.
- [ ] I almost exclusively teach lessons that allow students to use a variety of

information resources to build their own understanding of the content.

☐ I have a variety of teaching styles and select that style that is most appropriate to the content and to the needs of the student.

0016: On average, how many students are in your classroom?

Please write your answer here:

0017: How did you hear about the NOAA Ocean Data Education (NODE) project?

Please write your answer here:

*** 0018: Are you interested in earning continuing education credits for you work testing and evaluating our curriculum materials?**

Please choose *only one* of the following:

☐ Yes

☐ No

Submit Your Survey.

Thank you for completing this survey..

Appendix B: El Niño Evaluation Survey

El Niño Evaluation

About you

*** 0001: Your name**

Please write your answer here:

0002: School/Organization

Please write your answer here:

*** 0003: E-mail address**

Please write your answer here:

Lesson structure and format

0004: Please indicate the degree to which you agree or disagree with the following statements about the lesson structure and format.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The Investigating El Niño Using Real Data Teacher Guide provided me with a useful structure that gave me tips on how to integrate scientific content and real-time satellite data together.	☐	☐	☐	☐	☐
The format of the Web site was easy for me and my students to use to find resources, activities, and access relevant	☐	☐	☐	☐	☐

satellite data.					
The navigation format of the Web site was easy to use to select the El Niño Module, examine links about El Niño, Check Understanding, and Get Data.	☐	☐	☐	☐	☐
The graphs, maps, and charts of data were clear and easy to use.	☐	☐	☐	☐	☐
The instructional approach to the live access server simplified the data selection process by limiting the number of steps needed to select data.	☐	☐	☐	☐	☐

Use of scaled levels

* **0005: *Investigating El Niño Using Real Data* included five lessons at different levels. Check all levels that you and your students completed for the El Niño module.**

Please choose *all* that apply:

- ☐ Level 1: Entry -- Reading Sea Surface Temperature
- ☐ Level 2: Adoption -- Looking at SST Another Way
- ☐ Level 3: Adaptation -- Detecting El Niño
- ☐ Level 4: Interactivity -- Relating SST to Productivity
- ☐ Level 5: Invention -- Design Your Own Investigation

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* **0006: Why did you stop at the last level you completed?**

Please choose *all* that apply:

- ☐ I completed all the lessons
- ☐ The material was too difficult for my students.
- ☐ The material was too difficult for me to implement.
- ☐ I ran out of time to implement all the lessons.

- [ ] The additional lessons did not fit my needs.
- [ ] I have limited or no Internet access.
- [ ] The materials were not required by my school district.

Other: _____

0007: *Investigating El Niño Using Real Data* and its increasing levels of inquiry were helpful to me when integrating real-time data into my instructional practice.

Please choose *only one* of the following:

- [ ] Strongly agree
- [ ] Agree
- [ ] Neither agree nor disagree
- [ ] Disagree
- [ ] Strongly disagree

Level 1: Reading Sea Surface Temperature

[Only answer this question if you answered 'Level 1: Entry -- Reading Sea Surface Temperature' to question '0005 ']

0008: You told us that you completed Level 1: Reading Sea Surface Temperature with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson showed me how to access materials on the Web site such as lesson plans, maps, and real data.	☐	☐	☐	☐	☐
This lesson provided a useful way for me to introduce the topic to my	☐	☐	☐	☐	☐

students because it was very teacher-directed.					
This lesson helped me understand how to access real data on the Web site before I had to show my students how to use it.	☐	☐	☐	☐	☐

Level 2: Looking at SST Another Way

[Only answer this question if you answered 'Level 2: Adoption -- Looking at SST Another Way' to question '0005 ']

0009: You told us that you completed Level 2: Looking at SST Another Way with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson was useful for showing students how to work with the Web site the first time.	☐	☐	☐	☐	☐
This lesson was useful because my students were able to practice retrieving real data before they worked on a scientific problem.	☐	☐	☐	☐	☐
The opportunity to drill and practice helped my students and me become confident in accessing real data using the Web site.	☐	☐	☐	☐	☐
This lesson succeeded at bringing technology and science content together in a real world science	☐	☐	☐	☐	☐

context.					
The choice of education standards was appropriate.	☐	☐	☐	☐	☐

Level 3: Detecting El Niño

[Only answer this question if you answered 'Level 3: Adaptation -- Detecting El Niño' to question '0005 ']

0010: You told us that you completed Level 3: Detecting El Niño with your students. Please indicate the whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I found it useful to use both a teacher-directed and student-directed style to guide students in the collection of real data based on the science content.	☐	☐	☐	☐	☐
Students practiced applying data access skills to collecting real data.	☐	☐	☐	☐	☐
My students found the use of visualization tools such as graphing and map reading useful in order to understand science concepts.	☐	☐	☐	☐	☐

Level 4: Relating SST to Productivity

[Only answer this question if you answered 'Level 4: Interactivity -- Relating SST to Productivity' to question '0005 ']

0011: You told us that you completed Level 4: Relating SST to Productivity with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson allowed my students to use a variety of information resources to build their own understanding of the content.	☐	☐	☐	☐	☐
This lesson enabled my students to work with technology in a self-directed way.	☐	☐	☐	☐	☐
I did not have to give much guidance to my students to use their skills to access real data.	☐	☐	☐	☐	☐
Students were able to use student directed inquiry to solve a scientific problem using real data.	☐	☐	☐	☐	☐

Level 5: Design Your Own Investigation

[Only answer this question if you answered 'Level 5: Invention -- Design Your Own Investigation' to question '0005 ']

0012: You told us that you completed Level 5: Design Your Own Investigation with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson supported my use of a variety of teaching styles and my ability to select the style that is most appropriate to the content and to the needs of the student.	☐	☐	☐	☐	☐

This lesson supported my students in their study of the relationship between two different data sets and applying them to a real research problem.	☐	☐	☐	☐	☐
At this level my students were able to access and identify real data on the server and analyze it.	☐	☐	☐	☐	☐
When my students reached this level, they were able to use student-directed inquiry.	☐	☐	☐	☐	☐

Web site

0013: Please indicate whether you agree or disagree with the following statements about the project Web site.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The Data in the Classroom Web site was easy to use.	☐	☐	☐	☐	☐
The Data in the Classroom Web site helped me to integrate science “real world” content and activities with real data.	☐	☐	☐	☐	☐
This project helped students meet benchmarks and educational standards.	☐	☐	☐	☐	☐

Final thoughts

0014: After completing the Investigating El Niño Using Real Data module my students were are to do the following:

Please choose *all* that apply:

- [ ] Students were able to access and interpret data maps to display sea surface temperature.
- [ ] Students were able to use sea surface temperature data represented in map and graph displays.
- [ ] Students were able to apply sea surface temperature map and plot displays to a real problem – identifying an El Nino event.
- [ ] Students were able to examine the relationship between sea surface temperature and Chlorophyll-A to understand how El Nino affects ocean productivity.
- [ ] Students were able to design their own research project using real-time satellite data collection as a central component of the research design.

Other: _____

0015: Overall, I would rate the NODE materials:

Please choose *only one* of the following:

- [ ] Excellent
- [ ] Good
- [ ] Average
- [ ] Below average
- [ ] Poor

[Only answer this question if you answered 'Excellent' or 'Good' or 'Average' or 'Below average' or 'Poor' to question '0015 ']

0016: Please explain:

Please write your answer here:

0017: Do you have any additional thoughts you would like to share with the project developers?

Please write your answer here:

Submit Your Survey.

Thank you for completing this survey..

Appendix C: Sea Level Evaluation Survey

Sea Level Evaluation

About you

*** 0001: Your name**

Please write your answer here:

0002: School/Organization

Please write your answer here:

*** 0003: E-mail address**

Please write your answer here:

Lesson structure and format

0004: Please indicate the degree to which you agree or disagree with the following statements about the lesson structure and format.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The *Understanding Sea Level Using Real Data* module provided a useful context for teaching core science.	☐	☐	☐	☐	☐
The *Understanding Sea Level Using Real Data* Teacher Guide provided me with a useful structure that gave me tips on how to integrate scientific content and real data together.	☐	☐	☐	☐	☐

The graphs, maps, and charts of data were clear and easy to use.	☐	☐	☐	☐	☐

Use of scaled levels

* **0005: *Understanding Sea Level Using Real Data* included five lessons at different levels. Check all levels that you and your students completed for the Sea Level module.**

Please choose *all* that apply:

- ☐ Level 1: Entry -- Reading Sea Surface Height Data
- ☐ Level 2: Adoption -- Finding the Mean
- ☐ Level 3: Adaptation -- Reading Tide Data
- ☐ Level 4: Interactivity -- Measuring Storm Effects
- ☐ Level 5: Invention -- Designing Your Own Investigation

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* **0006: Why did you stop at the last level you completed?**

Please choose *all* that apply:

- ☐ I completed all the lessons
- ☐ The material was too difficult for my students.
- ☐ The material was too difficult for me to implement.
- ☐ I ran out of time to implement all the lessons.
- ☐ The additional lessons did not fit my needs.
- ☐ I have limited or no Internet access.
- ☐ The materials were not required by my school district.

Other: _____

0007: *Understanding Sea Level Using Real Data* and its increasing levels of inquiry were helpful to me when integrating real-time data into my instructional practice.

Please choose *only one* of the following:

- [ ] Strongly agree
- [ ] Agree
- [ ] Neither agree nor disagree
- [ ] Disagree
- [ ] Strongly disagree

Level 1: Reading Sea Surface Height Data

[Only answer this question if you answered 'Level 1: Entry -- Reading Sea Surface Height Data' to question '0005 ']

0008: You told us that you completed Level 1: Reading Sea Surface Height Data with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson showed me how to access materials on the Web site such as lesson plans, maps, and real data.	☐	☐	☐	☐	☐
This lesson provided a useful way for me to introduce the topic to my students because it was very teacher-directed.	☐	☐	☐	☐	☐
This lesson helped me understand how to access real data on the Web site before I had to show my students how to use it.	☐	☐	☐	☐	☐

Level 2: Finding the Mean

[Only answer this question if you answered 'Level 2: Adoption -- Finding the Mean' to question '0005 ']

0009: You told us that you completed Level 2: Finding the Mean with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson provided guidance to help students understand and compute the mean.	☐	☐	☐	☐	☐
This lesson was useful because my students were able to practice skills before they worked on a scientific problem.	☐	☐	☐	☐	☐
The tide model "applet" was useful for applying technology to science content in a real world context.	☐	☐	☐	☐	☐
The choice of education standards was appropriate.	☐	☐	☐	☐	☐

Level 3: Reading Tide Data

[Only answer this question if you answered 'Level 3: Adaptation -- Reading Tide Data' to question '0005 ']

0010: You told us that you completed Level 3: Reading Tide Data with your students. Please indicate the whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I found it useful to use both a teacher-directed and student-directed style to guide students in the collection of real	☐	☐	☐	☐	☐

data based on the science content.					
Students were able to compute the mean of real tide data.	☐	☐	☐	☐	☐
My students found the use of visualization tools such as the tide model and tide data form useful in order to understand science concepts.	☐	☐	☐	☐	☐

Level 4: Measuring Storm Effects

[Only answer this question if you answered 'Level 4: Interactivity -- Measuring Storm Effects' to question '0005 ']

0011: You told us that you completed Level 4: Measuring Storm Effects with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson allowed my students to use a variety of information resources to build their own understanding of the content.	☐	☐	☐	☐	☐
This lesson enabled my students to work with technology in a self-directed way.	☐	☐	☐	☐	☐
I did not have to give much guidance to my students to use their skills to access real data.	☐	☐	☐	☐	☐
Students were able to use student directed inquiry to solve a scientific problem using real data.	☐	☐	☐	☐	☐

Level 5: Designing Your Own Investigation

[Only answer this question if you answered 'Level 5: Invention -- Designing Your Own Investigation' to question '0005 ']

0012: You told us that you completed Level 5: Designing Your Own Investigation with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
At this level my students were able to create their own plan to answer a research question.	☐	☐	☐	☐	☐
At this level my students were able to access and identify real data on the server and analyze it.	☐	☐	☐	☐	☐
When my students reached this level, they were able to use student-directed inquiry.	☐	☐	☐	☐	☐

Web site

0013: Please indicate whether you agree or disagree with the following statements about the project Web site.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The Data in the Classroom Web site was easy to use.	☐	☐	☐	☐	☐
The Data in the Classroom Web site helped me to integrate science “real world” content and activities with real	☐	☐	☐	☐	☐

data.					
The navigation of the Web site was easy to use to select the Sea Level Module, examine links about sea level, check understanding, and get data.	☐	☐	☐	☐	☐
The online form made it easy to access satellite data.	☐	☐	☐	☐	☐
The online form made it easy to access local tide data.	☐	☐	☐	☐	☐
The tide model "applet" was a useful instructional tool.	☐	☐	☐	☐	☐
The online forms simplified the data selection process by limiting the number of steps needed to select data.	☐	☐	☐	☐	☐

Final thoughts

0014: Overall, I would rate the NODE materials:

Please choose *only one* of the following:

- ☐ Excellent
- ☐ Good
- ☐ Average
- ☐ Below average
- ☐ Poor

[Only answer this question if you answered 'Excellent' or 'Good' or 'Average' or 'Below average' or 'Poor' to question '0014 ']

0015: Please explain:

Please write your answer here:

0016: Do you have any additional thoughts you would like to share with the project developers?

Please write your answer here:

Submit Your Survey.

Thank you for completing this survey..

Appendix D: Water Quality Evaluation Survey

Water Quality Evaluation

About you

*** 0001: Your name**

Please write your answer here:

0002: School/Organization

Please write your answer here:

*** 0003: E-mail address**

Please write your answer here:

Lesson structure and format

0004: Please indicate the degree to which you agree or disagree with the following statements about the lesson structure and format.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The Monitoring Estuarine Water Quality Teacher Guide provided me with a useful structure that gave me tips on how to integrate scientific content and real-time data together.	☐	☐	☐	☐	☐
The format of the Web site was easy for me and my students to use to find resources, activities, and access relevant	☐	☐	☐	☐	☐

water quality data.					
The navigation format of the Web site was easy to use to select the Water Quality module, examine links about water quality, Check Understanding, and Get Data.	☐	☐	☐	☐	☐
The graphs, maps, and charts of data were clear and easy to use.	☐	☐	☐	☐	☐
The instructional approach to the online data forms simplified the data selection process by limiting the number of steps needed to select data.	☐	☐	☐	☐	☐

Use of scaled levels

* **0005: *Monitoring Estuarine Water Quality* included five lessons at different levels. Check all levels that you and your students completed for the Water Quality module.**

Please choose *all* that apply:

- ☐ Level 1: Entry -- Reading Water Temperature Data
- ☐ Level 2: Adoption -- Understanding Dissolved Oxygen
- ☐ Level 3: Adaptation -- Introducing Salinity
- ☐ Level 4: Interactivity -- Spawning of the Atlantic Sturgeon
- ☐ Level 5: Invention -- Design Your Own Investigation

---

* **0006: Why did you stop at the last level you completed?**

Please choose *all* that apply:

- ☐ I completed all the lessons
- ☐ The material was too difficult for my students.
- ☐ The material was too difficult for me to implement.

- [ ] I ran out of time to implement all the lessons.
- [ ] The additional lessons did not fit my needs.
- [ ] I have limited or no Internet access.
- [ ] The materials were not required by my school district.

Other:

0007: *Monitoring Estuarine Water Quality* and its increasing levels of inquiry were helpful to me when integrating real-time data into my instructional practice.

Please choose *only one* of the following:

- [ ] Strongly agree
- [ ] Agree
- [ ] Neither agree nor disagree
- [ ] Disagree
- [ ] Strongly disagree

Level 1: Reading Water Temperature Data

[Only answer this question if you answered 'Level 1: Entry -- Reading Water Temperature Data' to question '0005 ']

0008: You told us that you completed Level 1: Reading Water Temperature Data with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson showed me how to access materials on the Web site such as lesson plans, maps, and real data.	☐	☐	☐	☐	☐

This lesson provided a useful way for me to introduce the topic to my students because it was very teacher-directed.	☐	☐	☐	☐	☐
This lesson helped me understand how to access real data on the Web site before I had to show my students how to use it.	☐	☐	☐	☐	☐

Level 2: Understanding Dissolved Oxygen

[Only answer this question if you answered 'Level 2: Adoption -- Understanding Dissolved Oxygen' to question '0005 ']

0009: You told us that you completed Level 2: Understanding Dissolved Oxygen with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson was useful for showing students how to work with the Web site the first time.	☐	☐	☐	☐	☐
This lesson was useful because my students were able to practice retrieving real data before they worked on a scientific problem.	☐	☐	☐	☐	☐
The opportunity to drill and practice helped my students and me become confident in accessing real data using the Web site.	☐	☐	☐	☐	☐

This lesson succeeded at bringing technology and science content together in a real world science context.	☐	☐	☐	☐	☐
The choice of education standards was appropriate.	☐	☐	☐	☐	☐

Level 3: Introducing Salinity

[Only answer this question if you answered 'Level 3: Adaptation -- Introducing Salinity' to question '0005 ']

0010: You told us that you completed Level 3: Introducing Salinity with your students. Please indicate the whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I found it useful to use both a teacher-directed and student-directed style to guide students in the collection of real data based on the science content.	☐	☐	☐	☐	☐
Students practiced applying data access skills to collecting real data.	☐	☐	☐	☐	☐
My students found the use of visualization tools such as graphing useful in order to understand science concepts.	☐	☐	☐	☐	☐

Level 4: Spawning of the Atlantic Sturgeon

[Only answer this question if you answered 'Level 4: Interactivity -- Spawning of the Atlantic Sturgeon' to question '0005 ']

0011: You told us that you completed Level 4: Spawning of the Atlantic Sturgeon with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This lesson allowed my students to use a variety of information resources to build their own understanding of the content.	☐	☐	☐	☐	☐
This lesson enabled my students to work with technology in a self-directed way.	☐	☐	☐	☐	☐
I did not have to give much guidance to my students to use their skills to access real data.	☐	☐	☐	☐	☐
Students were able to use student directed inquiry to solve a scientific problem using real data.	☐	☐	☐	☐	☐

Level 5: Design Your Own Investigation

[Only answer this question if you answered 'Level 5: Invention -- Design Your Own Investigation' to question '0005 ']

0012: You told us that you completed Level 5: Design Your Own Investigation with your students. Please indicate whether you agree or disagree with the following statements about the lesson and materials provided at this level.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

This lesson supported my use of a variety of teaching styles and my ability to select the style that is most appropriate to the content and to the needs of the student.	☐	☐	☐	☐	☐
This lesson supported my students in their study of the relationship between two different data sets and applying them to a real research problem.	☐	☐	☐	☐	☐
At this level my students were able to access and identify real data on the server and analyze it.	☐	☐	☐	☐	☐
When my students reached this level, they were able to use student-directed inquiry.	☐	☐	☐	☐	☐

Web site

0013: Please indicate whether you agree or disagree with the following statements about the project Web site.

Please choose the appropriate response for each item:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The Data in the Classroom Web site was easy to use.	☐	☐	☐	☐	☐
The Data in the Classroom Web site helped me to integrate science “real world” content and activities with real data.	☐	☐	☐	☐	☐
This project helped students meet benchmarks and educational	☐	☐	☐	☐	☐

standards.

Final thoughts

0014: After completing the Monitoring Estuarine Water Quality module my students were are to do the following:

Please choose *all* that apply:

- ☐ Students were able to access and interpret data graphs.
- ☐ Students were able to examine the relationship between two water quality parameters plotted on the same graph.
- ☐ Students were able to apply data skills to examine variations in salinity in different parts of an estuary in order to support or disprove a hypothesis.
- ☐ Students were able to access and interpret water quality data to investigate the impact of water quality conditions on the behavior of the Atlantic Sturgeon.
- ☐ Students were able to develop a hypothesis to predict how changes in water quality parameters might influence the health or behaviors of organisms.
- ☐ Other: _____

0015: Overall, I would rate the NODE materials:

Please choose *only one* of the following:

- ☐ Excellent
- ☐ Good
- ☐ Average
- ☐ Below average
- ☐ Poor

[Only answer this question if you answered 'Excellent' or 'Good' or 'Average' or 'Below average' or 'Poor' to question '0015 ']

0016: Please explain:

Please write your answer here:

0017: Do you have any additional thoughts you would like to share with the project developers?

Please write your answer here:

Submit Your Survey.

Thank you for completing this survey..

Appendix E: E-mail Invitation

From: caroline at uwm.edu (Caroline Joyce)
Date: Tue, 04 Mar 2008 13:28:23 -0600
Subject: [Data in the Classroom] You Are Invited to Pilot NOAA Data in the Classroom

You Are Invited to Pilot NOAA Data in the Classroom

Earn Continuing Education Credits from the University of Wisconsin-Milwaukee as you pilot!!!!

Dear Educator:

You are invited to pilot an exciting online science project that integrates curriculum and real time data in to the classroom. Because of your interest in oceans and freshwater you and you middle and high school students were recommended to us to test the NODE Demonstration Pilot. Just what is NODE? NODE stands for NOAA Ocean Data Education and it provides an online place to experience the use of real data taken from satellite and buoy access servers linked to ocean events, such as sea surface temperature, water quality and sea level rise.

The NOAA Ocean Data Education (NODE) Project's "Investigating El Ni?o Using Real Data" curriculum guide contains five activities designed for grades 6-8 that incorporate real data from NOAA. If you would like to help test and evaluate this curriculum guide, please visit the new Data in the Classroom Web site at www.dataintheclassroom.org to register online.

Data in the Classroom is an online resource for teachers interested in using real scientific data in their teaching. The NODE Project is developing curriculum for grades 5-8 designed to help teachers and students use real scientific data to explore dynamic Earth processes and understand the impact of environmental events on a regional or global scale.

http://www.dataintheclassroom.org

If you have already received this announcement on another mailing list, we apologize for the duplication. Please let us

--
Caroline Joyce
School of Continuing Education
University of Wisconsin Milwaukee
161 W. Wisconsin Ave., Suite 6000 Milwaukee, WI 53203 USA
phone: 414-227-3365 fax: 414-227-3168

Appendix F: Participant Academic Credit Application

Important Information

If you wish to receive up to 6 Continuing Education Units (CEUs) from the University of Wisconsin-Milwaukee (2 per completed module) for your NODE participation, please complete and submit this registration form to caroline@uwm.edu. An official Transcript will follow after the completion of course requirements.

Please indicate which online CEU course/s you will participate in:

El Nino
Sea Level
Water Quality (Begins in the beginning of May)

Name: _____

Organization: _____

Address: _____

City: _____

Phone: _____

e-mail: _____

Don't hesitate to email us if you have any questions at caroline@uwm.edu

Caroline Joyce
University of Wisconsin-Milwaukee-School of Continuing Education
161 W. Wisconsin Ave., Suite 6000